

ROLE OF MAGNETIC RESONANCE IMAGING IN EVALUATION OF PATELLO-FEMORAL INSTABILITY

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Introduction

Transient patellar dislocation is a common sports-related injury in young adults. Although patients often present to the emergency department with acute knee pain and hemarthrosis, spontaneous reduction frequently occurs, and more than half of cases are assessed clinically with spontaneous reduction. Characteristic magnetic resonance imaging (MRI) findings often confirm the diagnosis and illustrate the underlying etiology. It is unusual for the patella to dislocate from trauma alone in a patient without predisposing factors for instability. The most common factors are trochlear dysplasia, patella alta, and lateralization of the tibial tuberosity. Structural changes associated with patellar mal-tracking include; injuries to the medial patellar stabilizers, superolateral Hoffa's fat pad impingement and chondral and osteochondral injuries.

Aim of the work

The aim of this study was to determine the role of MRI in patellofemoral instability.

Subjects and Methods

Target population: This was a case-control study that included 37 patients (34 of them had unilateral PFI and 3 patients had bilateral PFI) attending the orthopedic Unit at Alexandria University Hospitals with a history of patellofemoral instability in the form of transient patellar dislocation and 40 controls. A total of 80 knees were examined, 40 knees showed features of PFI and were considered as the case group, while 40 normal knees of age and sex-matched people were considered as the control group. **Before MR imaging, all individuals were assessed by:** Full history taking regarding the mechanism, number and circumstances of the patellar instability. Thorough Clinical examination. **MRI protocol** MR images of the knee were acquired by using a 1.5-T system with the manufacturer's knee coil. The patients were laid in a supine position, feet first, positioned the knee in the knee coil, and immobilized with cushions. The images of the selected patients were obtained in the following sequences: Axial T2WI, axial PD (fat suppression), sagittal T1WI (fat suppression), sagittal T2WI (fat suppression), sagittal PD (fat suppression) and coronal PD (fat suppression).

Results

Table (1): Comparison between the two studied groups according to the position of patella

Patella	Patients (n=40)		Control (n=40)		e ²	P
	No.	%	No.	%		
Normal	10	25.0	34	85.0	29.091*	<0.001*
Alta	30	75.0	6	15.0		
Baja	0	0.0	0	0.0		

Table (2): Distribution of the studied patients according to trochlear dysplasia and Dejour classification type

	No.	%
Trochlear dysplasia		
No	13	32.5
Yes	27	67.5
Dejour classification type	(n=27)	
A	10	37.0
B	6	22.2
C	7	25.9
D	4	14.8

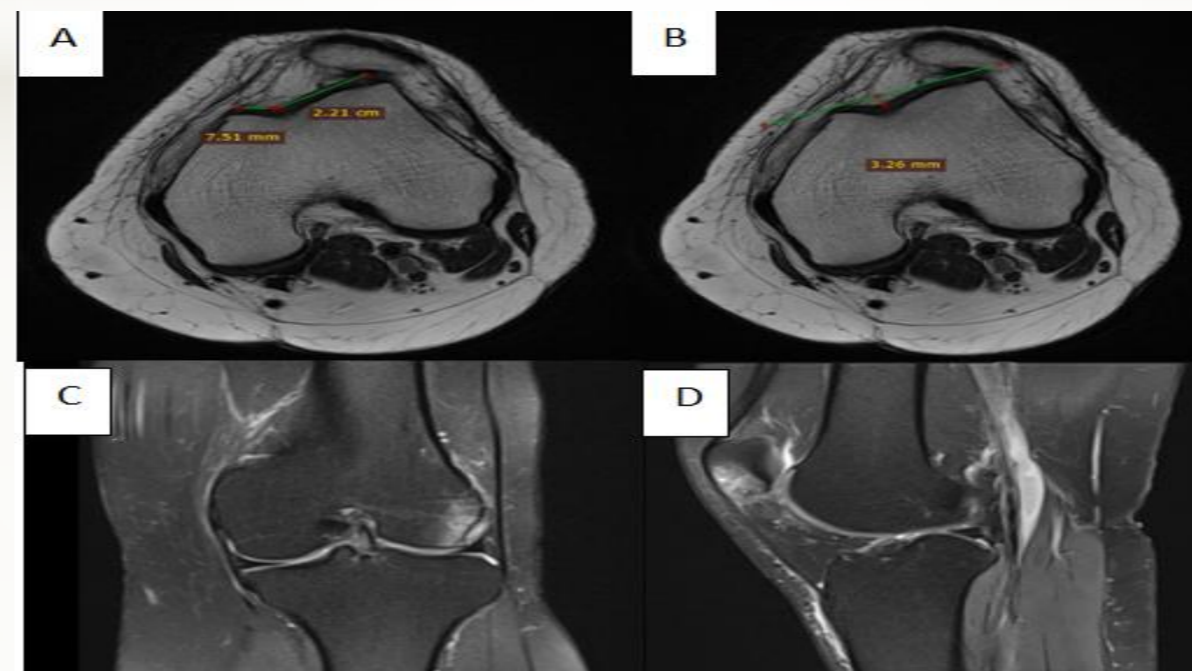


Figure (1): (A) Patient with trochlear dysplasia Type A, seen on axial T2 WI as trochlear facet asymmetry (B) and shallow trochlear groove. (C) PDWI coronal view, showing compression fracture anterior lateral femoral condyle. (D) PDWI, sagittal view showing infero-medial patellar pole osteochondral injury.

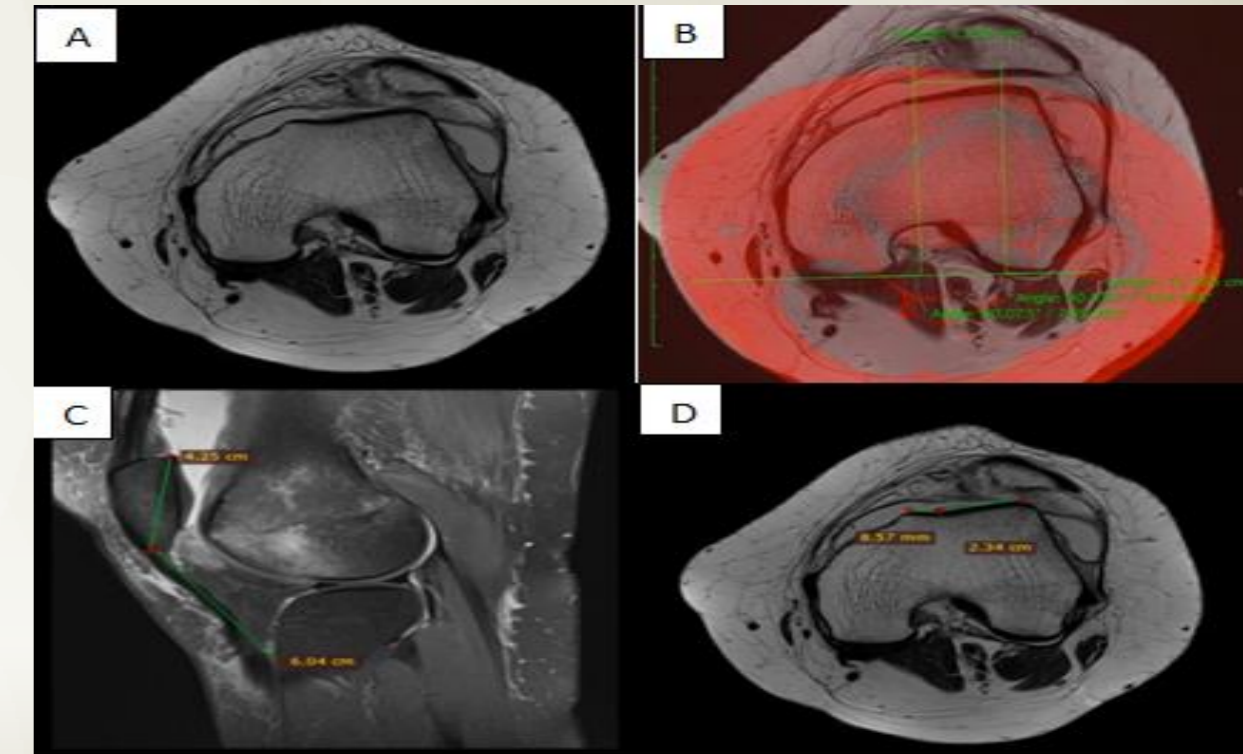


Figure (2): (A) Axial T2 showing almost flat trochlea, type B. (B) Axial T2 with fusion showing increased TT-TG measurement denoting patellar translation. (C) Sagittal PD fat suppression showing increased Insal Salvati index (6.04/4.25= 1.43) denoting patella alta, as well as moderate knee effusion. (D) Axial T2 sequence showing trochlear facets asymmetry and abnormal MT/LT ratio.

Conclusion

MRI plays a crucial role in revealing the origin of PFI and diagnosing anatomic variants contributing to the development of PFI, which helps in delineating patient-specific treatment. MRI can help radiologists to assess the risk factors for PFI, including trochlear dysplasia, patella alta, and lateralization of the tibial tuberosity. On MRI, increased Insal Salvati and Caton Deschamps indices, shallow trochlear groove depth, narrow LTI angle, increased TTTG distance, decreased MT/LT ratio, and increased the patellar tilt angle are associated with PFI.